NSAI Standards

Irish Standard
I.S. EN ISO 6416:2017

Hydrometry - Measurement of discharge by the ultrasonic transit time (time of flight) method (ISO 6416:2017)

I.S. EN ISO 6416:2017

Incorporating amendments/corrigenda/National Annexes issued since publication:

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National Foreword

I.S. EN ISO 6416:2017 is the adopted Irish version of the European Document EN ISO 6416:2017, Hydrometry - Measurement of discharge by the ultrasonic transit time (time of flight) method (ISO 6416:2017)

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 6416

November 2017

ICS 17.120.20

Supersedes EN ISO 6416:2005

English Version

Hydrometry - Measurement of discharge by the ultrasonic transit time (time of flight) method (ISO 6416:2017)

Hydrométrie - Mesure du débit par la méthode du temps de transit ultrasonique (temps de vol) (ISO 6416:2017)

Hydrometrie - Messung des Durchflusses mit dem Ultraschall-Laufzeitverfahren (Transit-time-/Time-of-flight-Verfahren) (ISO 6416:2017)

This European Standard was approved by CEN on 22 August 2017.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN ISO 6416:2017) has been prepared by Technical Committee ISO/TC 113 "Hydrometry" in collaboration with Technical Committee CEN/TC 318 "Hydrometry" the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2018, and conflicting national standards shall be withdrawn at the latest by May 2018.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 6416:2005.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 6416:2017 has been approved by CEN as EN ISO 6416:2017 without any modification.

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INTERNATIONAL STANDARD

ISO 6416

Fourth edition
2017-10

Hydrometry — Measurement of discharge by the ultrasonic transit time (time of flight) method

Hydrométrie — Mesure du débit par la méthode du temps de transit ultrasonique (temps de vol)

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 113, *Hydrometry*, Subcommittee SC 1, *Velocity area methods*.

This fourth edition cancels and replaces the third edition (ISO 6416:2004), which has been technically revised. The main changes from the previous edition are:

— the title has been changed;

— a new subclause (7.7) on wireless systems has been added;

— former subclauses 9.2 and 11.6 have been removed;

— Clause 10 on site selection has been revised;

— Annex A (*Principle of measurement uncertainty*) and Annex B (*Performance guide for hydrometric equipment for use in technical standards*) have been added.

Hydrometry — Measurement of discharge by the ultrasonic transit time (time of flight) method

1 Scope

This document describes the establishment and operation of an ultrasonic (transit-time) gauging station for the continuous measurement of discharge in a river, an open channel or a closed conduit. It also describes the basic principles on which the method is based, the operation and performance of associated instrumentation and procedures for commissioning.

It is limited to the "transit time of ultrasonic pulses" technique, and is not applicable to systems that make use of the "Doppler shift" or "correlation" or "level-to-flow" techniques.

This document is not applicable to measurement in rivers with ice.

NOTE This document focuses on open channel flow measurement. IEC 60041 covers the use of the technique for full pipe flow measurement.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 772, *Hydrometry — Vocabulary and symbols*

ISO 4373, *Hydrometry — Water level measuring devices*

ISO/TS 25377, *Hydrometric uncertainty guidance (HUG)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 772 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 Applications

4.1 Types of applications

a) Open channels

b) Multiple channels

c) Closed conduits

This method does not need a man-made or natural control, as it does not rely upon the establishment of a unique relationship between water level and discharge.